

of Applicant's file, Applicant's undersigned attorney notes that the application serial number contained on the Claim for Priority included a typographical error. In particular, the serial number on the Claim for Priority was listed as 09/661,443, rather than 09/661,433. Since Applicant's undersigned attorney does not have access to Application No. 09/661,443, the Examiner is requested to check the Patent Office file of Application No. 09/661,443 and obtain the Claim for Priority from that file if it is present therein. Applicant and Applicant's attorney thanks the Examiner in advance for his assistance with this matter.

If the Claim for Priority and certified priority documents are not present in the above-mentioned application, Applicant will obtain new copies of the priority documents for submission to the Patent Office.

II. Information Disclosure Statement

The Examiner is requested to consider the references that will be submitted in an Information Disclosure Statement to be filed shortly.

III. Formal Matters

The Office Action objected to the title. The title has been amended to overcome this objection. Withdrawal of the objection is requested.

Claims 13-15 stand rejected under 35 U.S.C. §112, second paragraph. This rejection is respectfully traversed.

The Office Action asserts that no method step is recited in these claims. Applicant submits that claims 13-15 have been amended to more clearly recite a method step. That is, the claims have been amended to recite a method step of "exposing a substrate to at least one pattern image utilizing the exposure apparatus according to" Applicant respectfully submits that it is proper to have a method claim depend from an apparatus claim, and that reciting a step ("exposing") by "utilizing" a previously-defined apparatus is appropriate. See, for example, MPEP § 2173.05(f), MPEP § 2173.05(q) and MPEP § 821.04. While the Office

Action cites MPEP § 2173.05(1), that subsection does not exist in the current version of the MPEP.

Withdrawal of the 35 U.S.C. §112, second paragraph, rejection is requested.

IV. All Pending Claims Are Patentable

Claims 1-15 stand rejected under 35 U.S.C. §102(b) over WO 99/28790 (Loopstra et al.) This rejection is respectfully traversed.

Applicant respectfully submits that Loopstra et al. does not disclose or suggest the combinations of features recited in each of the independent claims (claims 1, 6, 12 and 16) of this application. Accordingly, the independent claims, as well as their dependent claims, are patentable over Loopstra et al.

With respect to independent claim 1, Loopstra et al. does not disclose or suggest an arrangement in which, while the substrate stage is positioned at a predetermined position, (1) a first sensor, which measures a gap in an optical axis direction between a surface of a substrate and a control target position during exposure of the substrate, measures positional information of a surface of the reference plate in the optical axis direction; and (2) a second sensor detects a distance between the projection optical system and the substrate stage. Accordingly, independent claim 1 and its dependent claims are patentable over Loopstra et al.

Regarding independent claim 6, Loopstra et al. does not disclose or suggest an arrangement in which, while the substrate stage is positioned at a predetermined position, (1) a position measuring system, which measures a position of a surface of a substrate in an optical axis direction during exposure of the substrate, measures a position of a surface of the reference plate in the optical axis direction; and (2) a correction system measures a change of a distance between the projection optical system and the substrate stage. Accordingly, independent claim 6 and its dependent claims are patentable over Loopstra et al.

With respect to independent claim 12, Loopstra et al. does not disclose or suggest an arrangement in which, while the substrate stage is positioned at a predetermined position, (1) a position measuring system, which measures a position of a surface of a substrate in the optical axis direction during exposure of the substrate, measures a position of a surface of the reference plate in the optical axis direction; and (2) a correction system measures a change of a distance between the position measuring system and the substrate stage. Accordingly, independent claim 12 and its dependent claim are patentable over Loopstra et al.

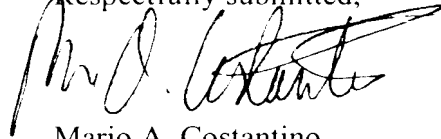
Regarding independent claim 16, Loopstra et al. does not disclose or suggest an arrangement in which, while the substrate stage is positioned at a predetermined position, (1) a first sensor system measures positional information in the optical axis direction of a surface of a reference plate provided on the substrate stage and located under the projection optical system; and (2) a second sensor system detects positional information in the optical axis direction of a reflector secured to the projection optical system. Accordingly, independent claim 16 and its dependent claims are patentable over Loopstra et al.

V. Conclusion

In view of the foregoing, Applicant respectfully submits that this application is in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.

Should the Examiner believe anything further would be desirable to place this application in even better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

Respectfully submitted,



Mario A. Costantino
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MAC/ccs

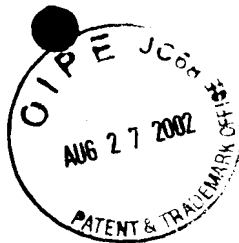
Attachments:

Appendix
Amendment Transmittal
Petition for Extension of Time

Date: August 27, 2002

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<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>
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APPENDIX

Changes to Title:

The following is a marked-up version of the amended title:

EXPOSURE APPARATUS AND DEVICE PRODUCTION METHOD OF DEVICE USING
THE SAME IN WHICH POSITION OF REFERENCE PLATE PROVIDED ON
SUBSTRATE STAGE IS MEASURED

Changes to Claims:

Claims 7 and 8 are canceled.

Claims 16-28 are added.

The following is a marked-up version of the amended claims:

1. (Amended) An exposure apparatus in which transfers an image of a pattern
image formed on a mask on to is projected onto a substrate through via a projection optical
system, comprising:
 - a ~~substrate table which holds said substrate~~ stage;
 - a reference plate on the substrate stage;
 - a first sensor having a projector and a receiver, which measures a gap in an
optical axis direction between a surface of said substrate surface held by said substrate table
stage and a control target position during exposure of the substrate, and said first sensor also
measures positional information of a surface of said reference plate in the optical axis
direction; and
 - a second sensor having a reflector secured to said projection optical system
and a bending reflection surface which directs a detecting light to the reflector, that detects
which measures a distance between said projection optical system and said substrate table
stage in an the optical axis direction and corrects the control target position of said first
sensor, wherein the substrate stage is positioned at a predetermined position while the first

sensor measures the position of said reference plate and while the second sensor detects the distance.

2. (Amended) The exposure apparatus according to claim 1, wherein ~~said second sensor measures a change amount of the distance between said projection optical system and said substrate table in the optical axis direction and corrects the control target position of said first sensor based on the change amount~~ a positional relationship between the projection optical system and the surface of the substrate is adjusted based on the positional information of the reference plate measured by the first sensor and the distance detected by the second sensor.

3. (Amended) The exposure apparatus according to claim 2, wherein ~~said second sensor measures a change amount of the distance between a position near said first sensor of said projection optical system and said substrate table in the optical axis direction~~ the control target position of the first sensor is corrected based on the positional information of the reference plate measured by the first sensor and the distance detected by the second sensor.

4. (Amended) The exposure apparatus according to claim 1, wherein said second sensor includes:

_____ ~~a laser interference measuring apparatus which measures a distance by irradiating a measurement light and interfering the reflected light with a reference light;~~

_____ ~~a first reflection mirror provided on said projection optical system; and~~

_____ ~~a second reflection mirror provided on the substrate table.~~

_____ an interferometer unit that emits the detecting light, and receives a reflection light from the reflector so as to detect said distance.

5. (Amended) The exposure apparatus according to claim 4, wherein ~~an opening for the measurement light irradiated from said laser interference measuring apparatus and a reflected light reflected on said first reflection mirror to transmit is provided on said substrate~~

table. the substrate stage has an opening for the detecting light and the reflection light to transmit through.

6. (Amended) An exposure apparatus in which transfers an image of a pattern image formed on a mask through is projected onto a substrate via a projection optical system, comprising:

a substrate ~~table~~ which holds said substrate stage;

a reference plate on the substrate stage;

a position measuring system which measures a position of a surface of said substrate ~~surface~~ held by said substrate ~~table~~ stage in an optical axis direction of said projection optical system during exposure of the substrate, the position measuring system also measuring a position of a surface of the reference plate in the optical axis direction;

a moving system which moves said substrate ~~table~~ stage in the optical axis direction based on a measurement result by the position measuring system; and

a correction system which measures a change of a distance between said projection optical system and said substrate ~~table~~ stage in said optical axis direction and corrects a position adjustment of the surface of said substrate in said optical axis direction using said position ~~measurement~~ measuring system and said moving system based on the measured change, and

wherein the substrate stage is positioned at a predetermined position while the position measuring system measures the position of the surface of the reference plate and while the correction system measures the change of said distance.

9. (Amended) The exposure apparatus according to claim 6, wherein said correction system comprises a sensor which measures a distance between a first reference surface of said projection optical system and a second reference surface of said substrate ~~table~~

stage to measure ~~a change of a~~ the distance between said projection optical system and said substrate ~~table~~ stage.

10. (Amended) The exposure apparatus according to claim 9, wherein said first reference surface and said second reference surface are flat ~~mirror~~ mirrors, and said sensor is an interferometer.

11. (Amended) The exposure apparatus according to claim 6, wherein an inclined state of said substrate ~~table~~ stage is always the same when measuring ~~a~~ the distance between said projection optical system and said substrate ~~table~~ stage in said optical axis direction.

12. (Amended) An exposure apparatus in which ~~transfers an image of~~ a pattern ~~image~~ formed on a mask ~~on to is projected onto~~ a substrate ~~through~~ via a projection optical system, comprising:

a substrate ~~table which holds said~~ stage;

a reference plate on the substrate stage;

a position measuring system which measures a position of a surface of said substrate ~~surface~~ held by said substrate ~~table~~ stage in an optical axis direction of said projection optical system during exposure of the substrate, the position measuring system also measures a position of a surface of the reference plate in the optical axis direction;

a moving system which moves said substrate ~~table~~ stage in the optical axis direction based on a measurement result by the position measuring system; and

a correction system which measures a change of a distance between said position measuring system and said substrate ~~table~~ stage in said optical axis direction and corrects a position ~~adjustment of~~ the surface of said substrate in said optical axis direction using said position measuring system and said moving system based on the measured change, and

wherein the substrate stage is positioned at a predetermined position while the position measuring system measures the position of the surface of the reference plate and while the correction system measures the change of said distance.

13. (Amended) A method of producing devices including ~~exposure processing of~~ exposing a substrate using to at least one pattern image utilizing the exposure apparatus according to claim 1.

14. (Amended) A method of producing devices including ~~exposure processing of~~ exposing a substrate using to at least one pattern image utilizing the exposure apparatus according to claim 6.

15. (Amended) A method of producing devices including ~~exposure processing of~~ exposing a substrate using to at least one pattern image utilizing the exposure apparatus according to claim 12.